

Dam ID: HI00063
Aahoaka Reservoir

Vulnerability Index:
Extreme High Moderate Low
1 2 3 4

Inspection No: _____
Date: 3/21/2006

STATE OF HAWAII - DLNR
VISUAL DAM SAFETY INSPECTION SHEET

Inspection Type: Visual Dam Safety Inspection

Persons Present	Affiliation	Phone Number
<u>Henri Mulder</u>	<u>USACE</u>	<u></u>
<u>Al Satogata</u>	<u>DLNR</u>	<u></u>
<u>Galen Kawakami</u>	<u>DLNR</u>	<u></u>
<u>Craig Koga</u>	<u>DLNR</u>	<u></u>

Weather Condition: ☐ Rain previous day ☒ Rainy ☐ Drizzle / Mist ☒ Cloudy/Overcast ☐ Partly Cloudy ☐ Sunny ☐ Dry
Comments: showers

1. General: *(Information currently on file, update as required)*

Dam/Res. Name	<u>Aahoaka Reservoir</u>		
Owner	<u>State of Hawaii</u>		
Owner Contact	<u>Tommy Oi – DLNR Division of Land Management</u>	Owner Ph.	<u></u>
Lessee	<u></u>	Lessee Ph.	<u></u>
O & M Contractor	<u></u>	O & M Ph.	<u></u>
Nearest City	<u></u>	Latitude	<u>22° 2.7' ° (decimal)</u>
County	<u></u>	Longitude	<u>159° 24.4' ° (decimal)</u>
Tax Map Key(s)	<u></u>		

Dam Status	<u></u>	Hazard Potential	<u></u>	Dam Size	<u></u>
Year Completed	<u>1910</u>	Dam Length	<u>550</u> ft.	Dam Height	<u>36</u> ft.
Normal Storage	<u>164</u> ac.ft.	Max. Storage	<u>210</u> ac.ft.	Max. Surface Area	<u></u> ac.
Offsite Drainage Area	<u></u> mi.	Spillway Type	<u></u>	Max. Spillway Q	<u></u> cfs

Owner owns land under dam facility: _____
Emergency Action Plan on file with the Department: _____
Reports on file with the Department: _____

2. Questions for Owner's Rep.:	Yes	No	Unknown	Comments
Construction Plans Available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Site / Facility Map	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Operation & Maintenance Manual	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Emergency Action Plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Modifications / Improvements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Conduct Routine Inspections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Conduct Routine Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vehicle access to site	x	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Not accessible <input type="checkbox"/> With Standard car X Requires 4-Wheel Drive
Access during heavy rains	x	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Not accessible <input type="checkbox"/> With Standard car X Requires 4-Wheel Drive
Access when spillway is flowing	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/> Not accessible <input type="checkbox"/> With Standard car <input type="checkbox"/> Requires 4-Wheel Drive
Other Studies Conducted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Phase I <input type="checkbox"/> Phase II <input type="checkbox"/> Hydraulics <input type="checkbox"/> Stability <input type="checkbox"/> Hazard <input type="checkbox"/> Seismic <input type="checkbox"/> Other: _____
Incident History	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Breached <input type="checkbox"/> Overtop <input type="checkbox"/> Slide <input type="checkbox"/> Down stream Flooding <input type="checkbox"/> Other: _____
Reservoir's Current Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Sediment <input type="checkbox"/> Irrigation <input type="checkbox"/> Recreation <input type="checkbox"/> Flood Control <input type="checkbox"/> Drinking Water <input type="checkbox"/> Power Generation <input type="checkbox"/> Other: _____

Findings and Corrective Actions:

- ☐ a. The Owner shall maintain documentations including Construction plans, specifications, improvements, modifications, Operations and Maintenance Manuals and routine inspection logs for this dam facility.
- ☐ b. An Emergency Action Plan (EAP) is on file with the department, submit any updates as applicable.
- ☐ c. An EAP is required for High Hazard Dams. Submit an updated EAP for this facility.
- ☐ d. An EAP is recommended for all dams regardless of hazard class. Submit EAP if developed for the facility.
- ☐ e. Submit narrative and additional information detailing the improvements, modifications, and/or alterations at the dam site, unless covered by approved dam permit.
- ☐ f. Routine inspection logs were not inspected.
- ☐ g. Dam owners shall provide for routine inspection of the dam.
- ☐ h. The dam did not appear to be maintained on a regular basis.
- ☐ i. Access to site appears to be satisfactory.
- ☐ j. There is no vehicular access to the dam site. Operational and emergency plans need to reflect this deficiency or access provided.
- ☐ k. Access to dam is questionable during severe weather conditions and/or spillway overflows. Operational plans and emergency plans need to reflect this deficiency or access provided.
- ☐ l. Provide a detailed narrative of the incident, responses taken, and any damages incurred. Dam owners are required to promptly advise the department of any sudden or unprecedented flood or unusual or alarming circumstance or occurrences which may adversely affect the dam or reservoir.
- ☐ m. Submit current Operations and Maintenance Manual or Procedures for this dam / reservoir facility.
- ☐ n. Submit Site or Facility Map of this Dam which identifies the location of major features including outlet works controls and conduits.
- ☐ o. _____

Additional Requirements:

The following investigative study(s) are:

Required	Recommended	
<input type="checkbox"/>	<input type="checkbox"/>	Phase I Study
<input type="checkbox"/>	<input type="checkbox"/>	Phase II Study (Including <input type="checkbox"/> Seepage <input type="checkbox"/> Hydrology/Hydraulics <input type="checkbox"/> EAP)
<input type="checkbox"/>	<input type="checkbox"/>	Hydrology and Hydraulics (including Probable Maximum Flood and spillway capacity)
<input type="checkbox"/>	<input type="checkbox"/>	Stability Analysis
<input type="checkbox"/>	<input type="checkbox"/>	Seismic Analysis
<input type="checkbox"/>	<input type="checkbox"/>	Hazard Classification
<input type="checkbox"/>	<input type="checkbox"/>	Other: _____

Physical Dam Features: (Check All Applicable. Provide description of Items Observed and/or Take Photos. Indicate photo # in description.)

3. Reservoir: Pool was about 35 feet below crest

Level during inspection unknown ft per _____ (gage / other)

Normal Operating Level/Range _____ ft per _____ (gage / other)

Description: _____

Typical Operation ☐ Spillway always flowing ☐ Kept within normal range ☒ Kept Empty ☐ Drained Daily ☐ Only filled by Storms

☐ Other: _____

Sinkhole in Res.: ☐ # Observed: _____ Size: _____ by _____ in. Deep ☐ Not Visible ☐ None Observed

Description: _____

Staff Gage: Description: _____

Findings:

- ☒ a. The reservoir was not inspected.
- ☐ b. The reservoir appeared to be in satisfactory condition, no corrective actions are required at this time.
- ☐ c. The reservoir appeared to be in fair to poor condition and requires corrective action.
- ☐ d. The reservoir appeared to be in unsatisfactory condition, urgent corrective action is required.

Corrective Actions:

- ☐ e. The staff gage needs maintenance and/or repair. Description: _____
- ☐ f. A staff gage was not observed at the reservoir. Provide some method of quantifying the water level within the reservoir.
- ☐ g. A sinkhole was observed in the upstream reservoir. Conduct additional investigations and monitoring to identify the cause, risk and appropriate action.
- ☐ h. _____

4. Intake Works Description:

☐ Number of Intakes _____

☐ Intake Culvert / Pipe

Size: _____ in. ☐ DIP ☐ Corrugated Metal ☐ PVC ☐ HDPE ☐ Concrete ☐ Other _____

Control: ☐ Gate ☐ Valve ☐ Flow can either be Shut off or Bypassed

From: ☐ Stream Diversion ☐ Pump ☐ Reservoir ☐ Other _____

☐ Ditch / Flume

Dimension: _____ (Size x Depth) Shape _____

Surface: ☐ Dirt ☐ Wood ☐ Concrete ☐ Lined w/ _____

Control: ☐ Gate ☐ Valve ☐ Flow can either be Shut off or Bypassed

From: ☐ Stream Diversion ☐ Pump ☐ Reservoir ☐ Other _____

Findings:

- ☒ a. The intake works were not inspected.
- ☐ b. The intake works were not tested.
- ☐ c. The intake works appeared to be in satisfactory condition, no corrective actions are required at this time.
- ☐ d. The intake works appeared to be in fair to poor condition and requires corrective action.
- ☐ e. The intake works appeared to be in unsatisfactory condition, urgent corrective action is required.

Corrective Actions:

- ☐ f. The intake works needs maintenance and/or repair. Description: _____
- ☐ g. _____

5. Upstream Slope:**(Typical Slope \pm 1 : 1/2 to 2*)**

Slope Protection: ☒ None ☐ Dumped Rock ☐ Fitted Rip Rap ☐ Grouted Rip Rap ☐ Liner _____ ☐ Other: _____

☐ Defect in Protection: Description: _____

Erosion: ☐ Loose soil w/ little vegetation ☐ Rut (<6") ☐ Gully (>6" deep) ☐ Not Visible ☐ None Observed

Description: _____

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible ☐ Not Visible ☒ None Observed

Description: _____

Sinkholes: ☐ # Observed: _____ Size: _____ and _____ Depth ☐ Not Visible ☒ None Observed

Description: _____

Vegetation: ☐ None ☐ Low Ground Cover ☒ Bushes or Tall Grass ☐ Trees # _____ ☐ <6" ☐ >6" & <20" ☐ >20"

Description: Entire face covered with 2' to 3' tall grass and vegetation

Findings:

- ☐ a. The upstream slope was not inspected.
- ☐ b. The upstream slope appeared to be in satisfactory condition, no corrective actions are required at this time.
- ☒ c. The upstream slope appeared to be in fair to poor condition and requires corrective action.
- ☐ d. The upstream slope appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

- ☐ e. Slope protection needs maintenance or repair. Description: _____
- ☐ f. Rut and/or Gully erosion was observed on the slope, which requires maintenance and/or repair. Description: _____
- ☐ g. A crack was observed on the slope, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.
- ☐ h. A sinkhole was observed on the slope, which requires further investigation to determine the underlining cause. Repair and monitor the area.
- ☒ i. The upstream slope was not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.
- ☐ j. Tree(s) were observed on the dam embankment. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.
- ☐ k. _____

*** - Upper 10' of slope is very steep (1V:1/2H), lower slope is flatter (1V:2H). It's unknown if the steep upper slope occurred due to erosion, sloughing, or if it is excess material that was pushed over the edge of the crest during road grading activities.**

6. Crest:Approximate Crest Width: 25'Access: ☐ None ☐ Walking Path ☒ Roadway, Surface / Width / Usage: Dirt roadErosion: ☐ Loose soil w/ little vegetation ☐ Rut (<6") ☐ Gully (>6" deep) ☐ Not Visible ☒ None Observed

Description: _____

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible ☐ Not Visible ☒ None Observed

Description: _____

Sinkholes: ☐ _____ in. Wide ☒ _____ in. Long ☒ _____ in. Deep ☐ Not Visible ☒ None Observed

Description: _____

Vegetation: ☒ None ☐ Low Ground Cover ☐ Bushes or Tall Grass ☐ Trees # _____ ☐ <6" ☐ >6" & <20" ☐ >20"

Description: _____

Findings:

- ☐ a. The dam crest was not inspected.
- ☒ b. The dam crest appeared to be in satisfactory condition, no corrective actions are required at this time.
- ☐ c. The dam crest appeared to be in fair to poor condition and requires corrective action.
- ☐ d. The dam crest appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

- ☐ e. Access along the crest was satisfactory.
- ☐ f. Access along the crest was not possible. Description: _____
- ☐ g. Rut and/or Gully erosion was observed on the crest, which requires maintenance and/or repair. Description: _____
- ☐ h. A crack was observed on the crest, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.
- ☐ i. A sinkhole was observed on the crest, which requires further investigation to determine the underlining cause. Repair and monitor the area.
- ☐ j. Portions of the crest were not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.
- ☐ k. Tree(s) were observed along the dam crest. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.
- ☐ l. _____

7. Downstream Slope:**(Typical Slope \pm 1 : 1.5 to 2)**Access: ☐ lower roadway along toe ☐ roadway to outlet works ☐ walkway to outlet works ☒ None ObservedSlope Protection: ☒ None ☐ Dumped Rock ☐ Rip Rap ☐ Grouted Rip Rap ☐ ConcreteErosion: ☐ Loose soil w/ little vegetation ☐ Rut (<6") ☐ Gully (>6" deep) ☐ Not Visible ☒ None Observed

Description: _____

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible ☐ Not Visible ☒ None Observed

Description: _____

Sinkholes: ☐ _____ in. Wide ☒ _____ in. Long ☒ _____ in. Deep ☐ Not Visible ☒ None Observed

Description: _____

Vegetation: ☐ None ☐ Low Ground Cover ☒ Bushes or Tall Grass ☒ Trees # lots ☐ <6" ☒ >6" & <20" ☐ >20"Description: Difficult to inspect the slope because of vegetation.Seepage: Seep Spot Number 1☐ Green Vegetation ☐ Wet or Muddy Ground ☐ Ponding Water ☐ Not Visible ☒ None Observed☐ Flowing, Description: _____Water Clarity: ☐ Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: _____

Seep Spot Number 2☐ Green Vegetation ☐ Wet or Muddy Ground ☐ Ponding Water ☐ Not Visible ☐ None Observed☐ Flowing, Description: _____Water Clarity: ☐ Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: _____

Findings:

- ☐ a. The downstream slope was not inspected.
- ☐ b. The downstream slope appeared to be in satisfactory condition, no corrective actions are required at this time.
- ☒ c. The downstream slope appeared to be in fair to poor condition and requires corrective action.
- ☐ d. The downstream slope appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

- ☐ e. Slope protection needs maintenance or repair. Description: _____
- ☐ f. Rut and/or Gully erosion was observed on the slope, which requires maintenance and/or repair. Description: _____
- ☐ g. A crack was observed on the slope, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.
- ☐ h. A sinkhole was observed on the slope, which requires further investigation to determine the underlining cause. Repair and monitor the area.
- ☒ i. The down stream slope was not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.
- ☐ g. Tree(s) were observed on the downstream slope. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.
- ☐ h. Seepage/Ponding water was observed. Monitor and conduct further investigation to locate the source of water and extent of any possible hazardous or developing condition.
- ☐ i. Seepage was observed flowing and particles were observed to be removed by the flow. Take immediate action to stop the loss of soil from the embankment. Conduct further investigation to determine the underlining cause and take corrective action. Monitor the area.
- ☒ j. The slope was very steep, around a 1 to 1 slope, further study is required to verify slope stability.
- ☐ k. _____

8. Abutments/Toe:

Erosion: ☐ Loose soil w/ little vegetation ☐ Rut (<6") ☐ Gully (>6" deep) ☐ Not Visible ☒ None Observed
 Description: _____

Cracks: ☐ Parallel with crest ☐ Perpendicular to crest ☐ Slide visible ☐ Not Visible ☒ None Observed
 Description: _____

Vegetation: ☐ None ☐ Low Ground Cover ☒ Bushes or Tall Grass ☒ Trees # lots ☒ <6" ☒ >6" & <20" ☐ >20"
 Description: _____

Seepage: Seep Spot Number 1
☐ Green Vegetation ☒ Wet or Muddy Ground ☒ Ponding Water ☐ Not Visible ☐ None Observed
☒ Flowing, Description: Flowrate of 10 gpm on the right side of the valley bottom.
 Water Clarity: ☒ Clear ☐ Some particles ☐ Muddy ☐ Other: _____
 Description: Seepage was clear. Seeping has been occurring for a while because of alge growth. No imminent threat of dam failure from the current seepage conditions. Dam owner should monitor seepage when pool elevation increases.

Seep Spot Number 2
☐ Green Vegetation ☐ Wet or Muddy Ground ☒ Ponding Water ☐ Not Visible ☐ None Observed
☐ Flowing, Description: seepage on the right side valley bottom
 Water Clarity: ☐ Clear ☐ Some particles ☐ Muddy ☐ Other: _____
 Description: Ponded water at valley bottom. Could not find seepage exit points. Water likely from seepage flowing down from the right abutment

Findings:

- ☐ a. The abutments/toe were not inspected.
- ☐ b. The abutments/toe appeared to be in satisfactory condition, no corrective actions are required at this time.
- ☒ c. The abutments/toe appeared to be in fair to poor condition and requires corrective action.
- ☐ d. The abutments/toe appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

- ☐ e. Slope protection needs maintenance or repair. Description: _____
- ☐ f. Rut and/or Gully erosion was observed, which requires maintenance and/or repair.
 Description: _____
- ☐ g. A crack was observed along the abutments/near the toe, which requires further investigation to determine the underlining cause. Monitor the area and/or repair as required.
- ☐ h. The abutment/toe area was not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.
- ☐ i. Tree(s) were observed along the abutment/toe. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.
- ☒ j. Seepage/Ponding water was observed. Monitor and conduct further investigation to locate the source of water and extent of any possible hazardous or developing condition.
- ☐ k. Seepage was observed flowing and particles were observed to be removed by the flow. Take immediate action to stop the loss of soil from the embankment. Conduct further investigation to determine the underlining cause and take corrective action. Monitor the area.
- ☐ l. _____

9. Outlet Works:

Culvert / Pipe

Type / Size: Location of the dam outlet unknown

Culvert: ☐ Concrete ☐ Masonry ☐ unlined earth ☐ Other _____

Pipe: ☐ DIP ☐ Corrugated Metal ☐ PVC ☐ HDPE ☐ Concrete ☐ Other _____

Control Type: ☐ Gate ☐ Valve ☐ Other _____

Location: ☐ Control on Upstream side ☐ Control on Downstream side

Seepage: ☐ Green Vegetation ☐ Wet or Muddy Ground ☐ Ponding Water ☐ Not Visible ☐ None Observed

☐ Flowing, Description: _____

Water Clarity: ☐ Clear ☐ Some particles ☐ Muddy ☐ Other: _____

Description: _____

Findings:

- ☐ a. The outlet works were not inspected.
- ☐ b. The outlet works were not tested.
- ☐ c. The outlet works appeared to be in satisfactory condition, no corrective actions are required at this time.
- X d. The outlet works appeared to be in fair to poor condition and requires corrective action.
- ☐ e. The outlet works appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

- ☐ f. Seepage/Ponding water was observed. Conduct further investigation to locate the source of water and extent of any possible hazardous or developing condition.
- ☐ g. Seepage was observed flowing and particles were observed to be removed by the flow. Take immediate action to stop the loss of soil. Conduct further investigation to determine the underlining cause and take corrective action. Monitor the area. Failures caused by seepage/piping along the outlet conduit are very common and are considered to be a dangerous situation.
- ☐ h. Were not visible due to high grass and bush vegetation. Clear high vegetation and maintain low to enable easy visual inspection.
- ☐ i. Tree(s) were observed on the dam embankment. Trees have been identified as the probably cause of piping failures, and can possibly cause sever damage to the embankment if they are uprooted during a high winds. Corrective action is required to remove the tree hazards from the dam. Acceptable remedies include removal of the tree and its root structure down to a 2" diameter and reconstructing the damaged embankment section. All repair work shall be accomplished as per the requirements of licensed geotechnical or structural engineer. Routinely monitor the damaged area for signs of settlement and seepage.
- X j. Need to locate the outlet works and inspect

10. Spillway:

Type: ☐ None ☐ Culvert/Pipe ☒ Channel

Description: _____

Dimension: _____ 60 _____ ft. Invert elevation: _____ ft. per staff gage

Slope Protection: ☐ None ☐ Grass ☐ Dumped Rock ☐ Fitted Rip Rap ☐ Grouted Rip Rap ☐ Concrete

☐ Defect in Protection: Description: _____

Approach: ☐ Clear ☒ High Veg. ☐ Trees ☐ Other: _____

Erosion: ☐ Scour ☐ Gully ☐ Headcut ☒ Not Observed ☐ Other: _____

Description: _____

Vegetation: ☐ None ☐ Low Ground Cover ☒ Bushes or Tall Grass ☒ Trees # lots ☒ x <6" ☐ >6" & <20" ☐ >20"

Description: Lots of trees in spillway exit channel about 100' D/S of sill.

Findings:

- ☐ a. The Spillway appeared to be in satisfactory condition, no corrective actions are required at this time.
- ☒ b. The Spillway appeared to be in fair to poor condition and requires corrective action.
- ☐ c. The Spillway appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

- ☐ d. Slope protection needs maintenance or repair. Description: _____
- ☐ e. The spillway approach was blocked. Clear approach.
- ☐ f. Severe scour erosion was observed which requires maintenance and/or repair.
Description: _____
- ☐ g. A headcut was observed downstream of the spillway. Corrective / mitigative action is required to prevent this problem from moving upstream.
- ☒ h. Trees are unacceptable in the spillway channel and approach. Take corrective action to address the woody vegetation problem and repair the damaged area.
- ☐ i. Unclear if spillway is adequately sized. Spillway should pass the probable maximum flood. Verify spillway capacity and take corrective action as required.
- ☒ j. New fence posts were observed near the exit channel. Dam owner should ensure that the fence doesn't block spillway channel.

11. Down Stream Channel:

Name: _____

Downstream: ☐ Sump ☐ Open Area ☐ Un-Defined Drainage-way ☐ Defined Drainage-way ☐ Other _____

Items along Stream Bank: ☐ None ☐ Road ☐ Houses ☐ Town ☐ Not Inspected

Description: _____

Findings:

- ☒ a. The downstream channel was not inspected.
- ☐ b. The downstream channel appeared to be in satisfactory condition, no corrective actions are required at this time.
- ☐ c. The downstream channel appeared to be in fair to poor condition and requires corrective action.
- ☐ d. The downstream channel appeared to be in unsatisfactory condition and not expected to fulfill its intended function. Urgent corrective action is required.

Corrective Actions:

- ☐ e. _____

Additional Comments:**FINDINGS:**

Conclusion: On the date of this limited visual inspection, there appeared to be no immediate threat to the safety of the dam. No assurance can be made regarding the dam's condition after this date. Subsequent adverse weather and other factors may affect the dam's condition.

Short Term Recommendation:

Routinely monitor the seepage on the right side of valley bottom. Monitor the area daily if reservoir pool rises from today's elevation. Clear the vegetation around the seepage areas to assist inspection. The seepage sites were flagged by the inspectors.

Long Term Recommendations:

1. Remove trees in the spillway exit channel. Debris is prone to catch on the trees and block the spillway from functioning as designed.
2. The upstream and downstream slopes of the embankment should be clear and visible for inspection. Underbrush should be cleared and grasses kept short. Trees have been allowed to grow so large in some cases that there is concern that seepage along the root systems may develop. There is additional concern that cutting and killing the trees will lead to rotten roots and greater potential for seepage. A more in depth evaluation of the vegetation conditions should be performed to determine how best to remediate the condition.
3. A path or roadway along the groins, toe, and to the outlet works should be cleared and maintained to facilitate periodic inspection, maintenance, and monitoring of seepage conditions.
4. Seepage was observed along the downstream toe of the dam near the right side of the valley floor. The rate of seepage should be measured with a V-notch weir or Parshall flume. The rate of seepage should be measured with respect to the reservoir pool elevation.
5. A seepage study should be conducted by a geotechnical engineer to determine the stability of the dam with regards to seepage in the foundation and through the embankment.
6. The upstream and downstream slopes of the embankment are very steep (steeper than 1V:2H). The stability of the slopes should be further evaluated. If the factor of safety against sliding is less than the required factor of safety, flattening of the slopes or construction of a stability berm will be required. The upper 10 feet of the downstream slope is very steep and impossible to traverse. This section of the slope should be reshaped to aid access from the crest to the slope.
7. The upper 10 feet of the upstream slope is very steep and is prone to erosion and sloughing. The slope should be reshaped.

Limitations and Intent of this Dam Safety Inspection:

This Dam Safety Inspection was conducted to assess the general overall condition of the reservoir/dam, identify visible deficiencies, and recommend areas of for monitoring, additional investigative studies and corrective actions. The inspection is based only on visible features/areas of the dam on the day of inspection. This inspection is not a formal phase I or phase II dam safety inspection and does not include a review or evaluation from each specialist of an inspection team, such as a geologists, civil, geotechnical, structural, or hydraulics engineer. The owner should verify the findings of this report and take corrective actions. The owner may submit to the State alternative corrective actions that are certified by a licensed professional engineer in the State of Hawaii experienced in the design and construction of dams. This inspection does not relieve the owner/operator from their responsibility to conduct routine inspections, maintenance, repairs,

modifications, monitoring, documentation, and/or investigative studies. The inspection was conducted under the authority of the Hawaii Revised Statutes Chapter 179D, and Hawaii Administrative Rules, Title 13, Chapter 190, titled "Dams and Reservoirs". Questions regarding this inspection should be forwarded to the Hawaii State Dam Safety Program; PO Box 373; Honolulu, Hawaii 96809; Ph. (808) 587-0236.



HI00063 - Aahoaka Reservoir: Spillway exit channel. Note the trees in the exit channel.



HI00063 - Aahoaka Reservoir: Vegetation in the spillway approach channel.



HI00063 - Aahoaka Reservoir: View of downstream slope and crest. Note the dense vegetation on the slope.



HI00063 - Aahoaka Reservoir: View of the upstream slope with vegetation.



HI00063 - Aahoaka Reservoir: View of the upstream slope with vegetation.



HI00063 - Aahoaka Reservoir: Seepage on the right side of the valley floor.